

CLAIMS

1. An exhaust gas treating apparatus comprising:
a case body functioning as a passage of exhaust gas containing substances to be
5 treated, and
a plasma producing means capable of producing plasma inside the case body; and
treating the substances to be treated contained in the exhaust gas by the plasma produced
by the plasma producing means;
wherein the plasma producing means has one or more each of a pulse electrode
10 and a ground electrode that are oppositely disposed in the case body and has a pulse
power source capable of feeding a pulse current to the pulse electrode, and by switching
frequency and/or voltage value for different values at predetermined time intervals so that
plasma of a kind adequate for the substances to be treated contained in an exhaust gas is
produced between the pulse electrode and the ground electrode, the substances to be
15 treated in the exhaust gas can selectively be treated.
2. An exhaust gas treating apparatus according to Claim 1, wherein the predetermined
time intervals are 0.01 to 500 seconds.
- 20 3. An exhaust gas treating apparatus according to Claim 1 or 2, wherein the pulse power
source is capable of feeding a pulse current by switching from a first pulse current having
a frequency of 100 to 1000 Hz to a second pulse current having a frequency of 500 to
2500 Hz, and vice versa.
- 25 4. An exhaust gas treating apparatus according to any one of Claims 1 to 3, wherein the
pulse power source is capable of feeding a pulse current by switching from a third pulse
current having a voltage value of 2 to 5 kV to a fourth pulse current having a voltage
value of 3 to 20 kV, and vice versa.

5. An exhaust gas treating apparatus according to any one of Claims 1 to 4, wherein the pulse electrode and/or the ground electrode comprise(s) a ceramic body functioning as a dielectric body and a conductive film disposed in the ceramic body.
- 5 6. An exhaust gas treating apparatus according to any one of Claims 1 to 5, which further comprises a catalyst on a downstream side of the plasma producing means in the passage of exhaust gas.
7. An exhaust gas treating method treating substances to be treated contained in an
10 exhaust gas by plasma produced in a passage of the exhaust gas containing the substances to be treated,
wherein one or more each of a pulse electrode and a ground electrode are oppositely disposed, and a pulse current is fed by switching frequency and/or voltage for different values at predetermined time intervals so that plasma of a kind adequate for the
15 substances to be treated contained in an exhaust gas is produced between the pulse electrode and the ground electrode to selectively treat the substances to be treated in the exhaust gas.
8. An exhaust gas treating method according to Claim 7, wherein the predetermined time
20 intervals are 0.01 to 500 seconds.
9. An exhaust gas treating method according to Claim 7 or 8, wherein the pulse power source is capable of feeding a pulse current by switching from a first pulse current having a frequency of 100 to 1000 Hz to a second pulse current having a frequency of 500 to
25 2500 Hz, and vice versa.
10. An exhaust gas treating method according to any one of Claims 7 to 9, wherein the pulse power source is capable of feeding a pulse current by switching from a third pulse

current having a voltage value of 2 to 5 kV to a fourth pulse current having a voltage value of 3 to 20 kV, and vice versa.

11. An exhaust gas treating method according to any one of Claims 7 to 10, wherein the
5 exhaust gas is exhausted from an automobile engine, and the pulse current is fed by switching, step-by-step, frequency and/or voltage for different values at predetermined time intervals in correspondence with change in revolution and/or load of the engine.
12. An exhaust gas treating method according to any one of Claims 7 to 11, wherein the
10 exhaust gas is exhausted from an automobile engine, and the predetermined time intervals for switching frequency and/or voltage value for different values is changed step-by-step in correspondence with change in revolution and/or load of the engine.
13. An exhaust gas treating method according to any one of Claims 7 to 12, wherein a
15 catalyst is further disposed on a downstream side of the portion where the plasma is produced in the passage of exhaust gas to further treat exhaust gas passed through the plasma by the catalyst.